

Does season of burn influence fuel life cycle and fire behavior in longleaf pine flatwoods of the southeastern US?



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Overview

- Background
- Hypothesis
- Methods
- Results
- Conclusions
- Further analysis

Background: the longleaf pine ecosystem



Longleaf pine flatwoods. Apalachicola National Forest, Florida. Jim Cronan, 2012.

Background: reference conditions



Pre-fire suppression flatwoods, southern Florida. John K Small, 1928.

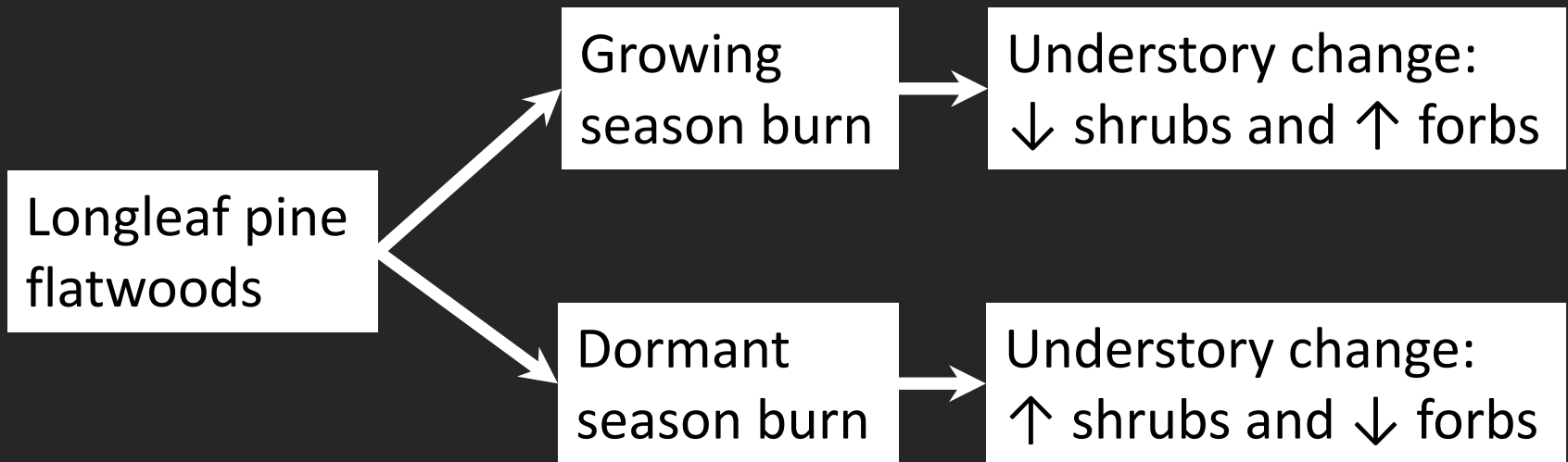
Background: current management



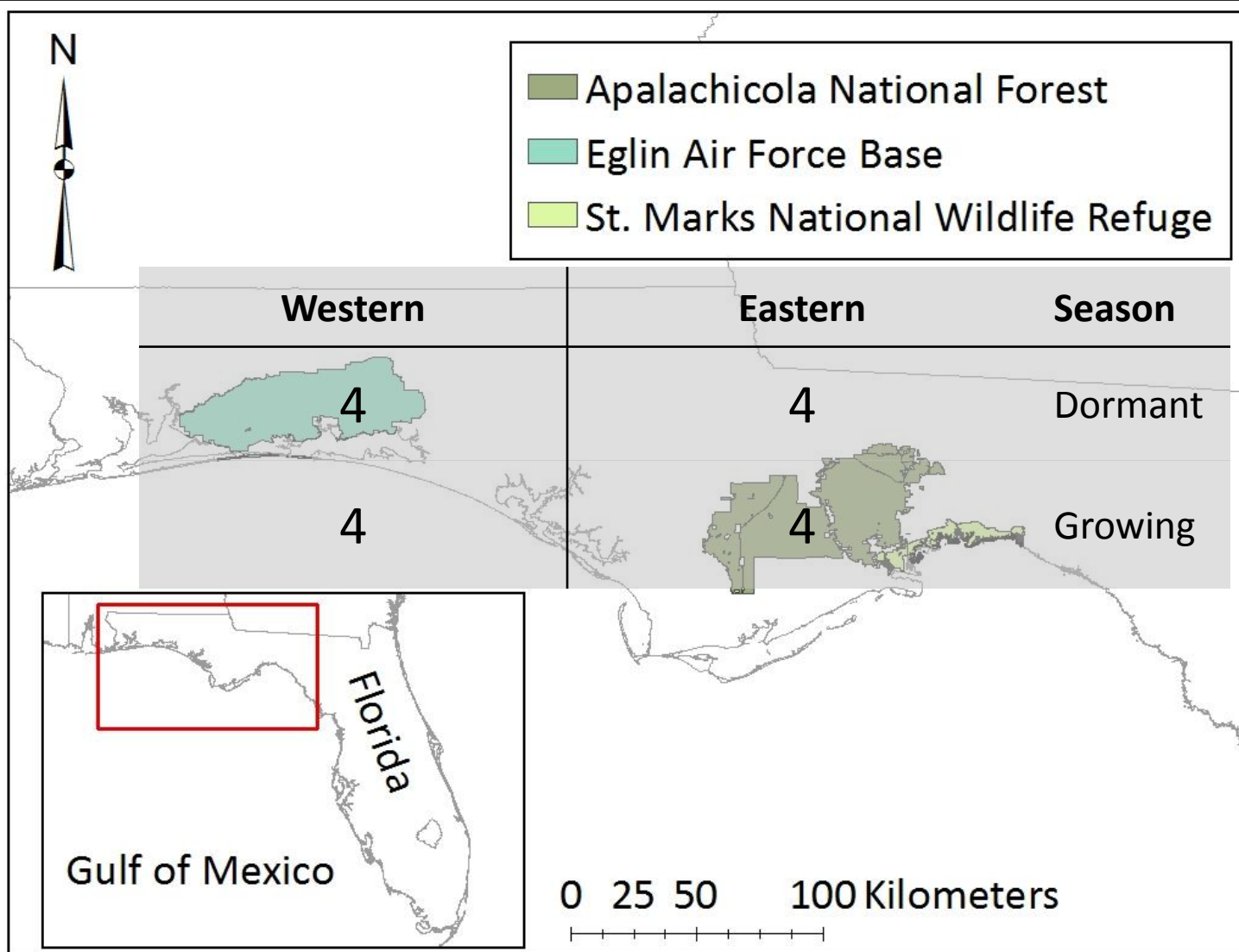
Prescribed fire, Apalachicola National Forest, Florida. Jim Cronan, 2010.

Hypotheses

- H_1 : Forb biomass regeneration is greater following growing season burns.
- H_2 : Shrub biomass regeneration is greater following dormant season burns.



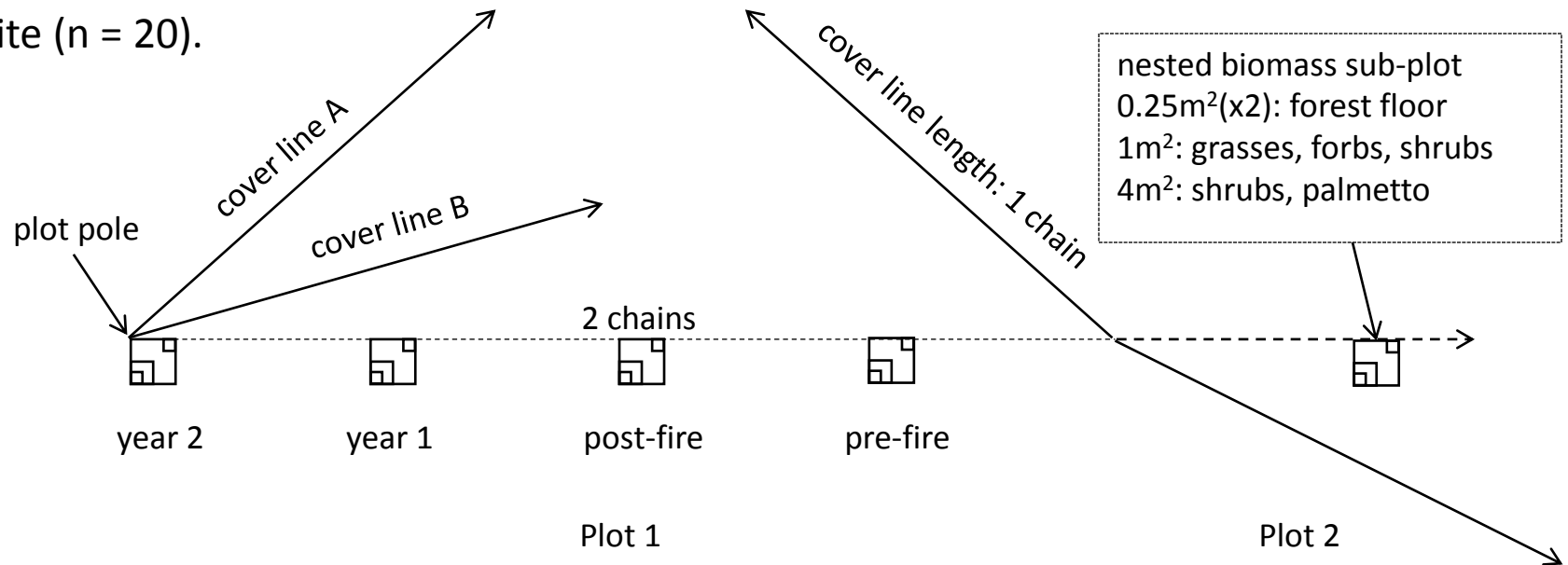
Methods: study area



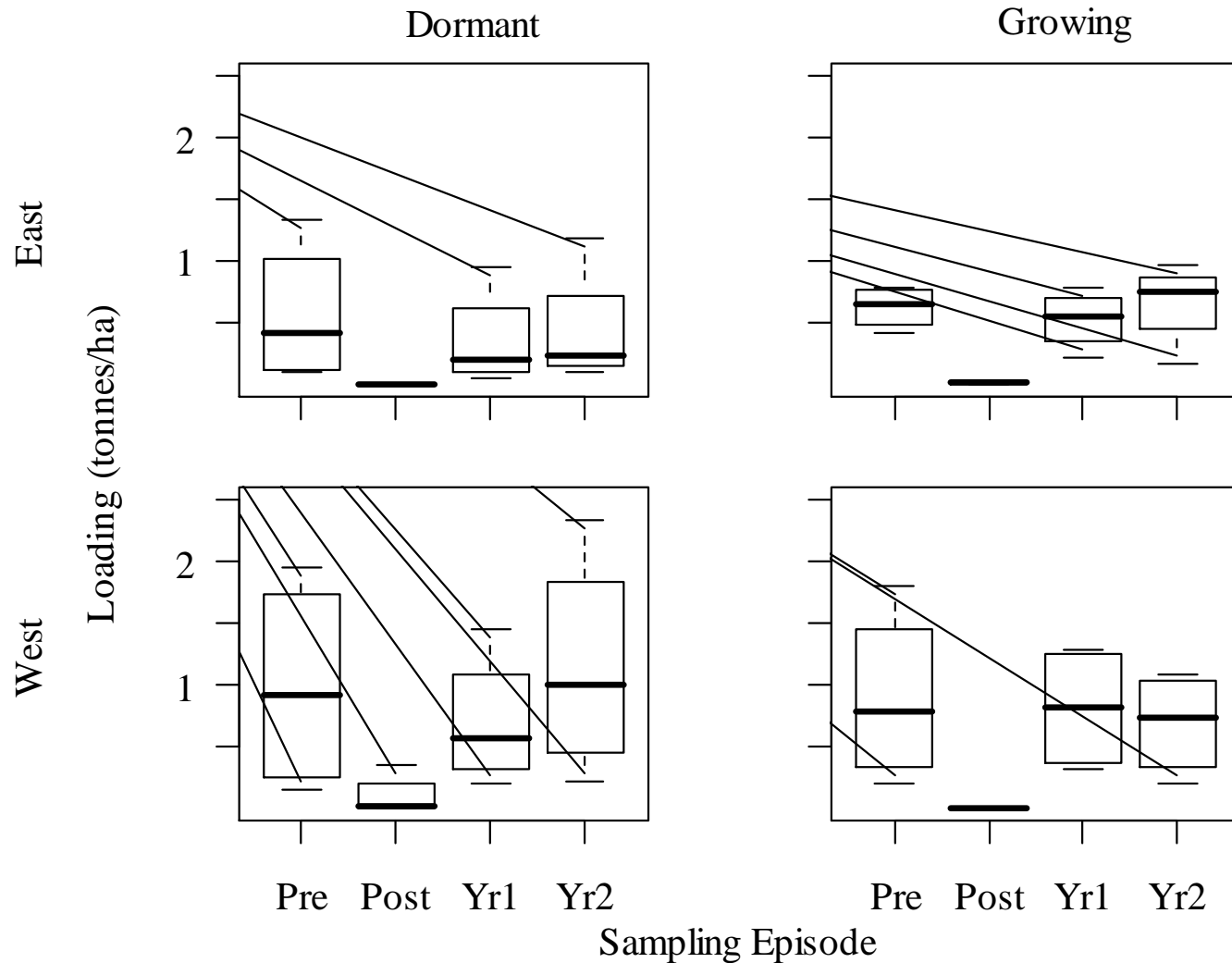
Methods: sampling design

- Systematic plot layout fit to natural stand boundaries
- Measures include loading, percent cover, fuelbed height, and forest floor depth.

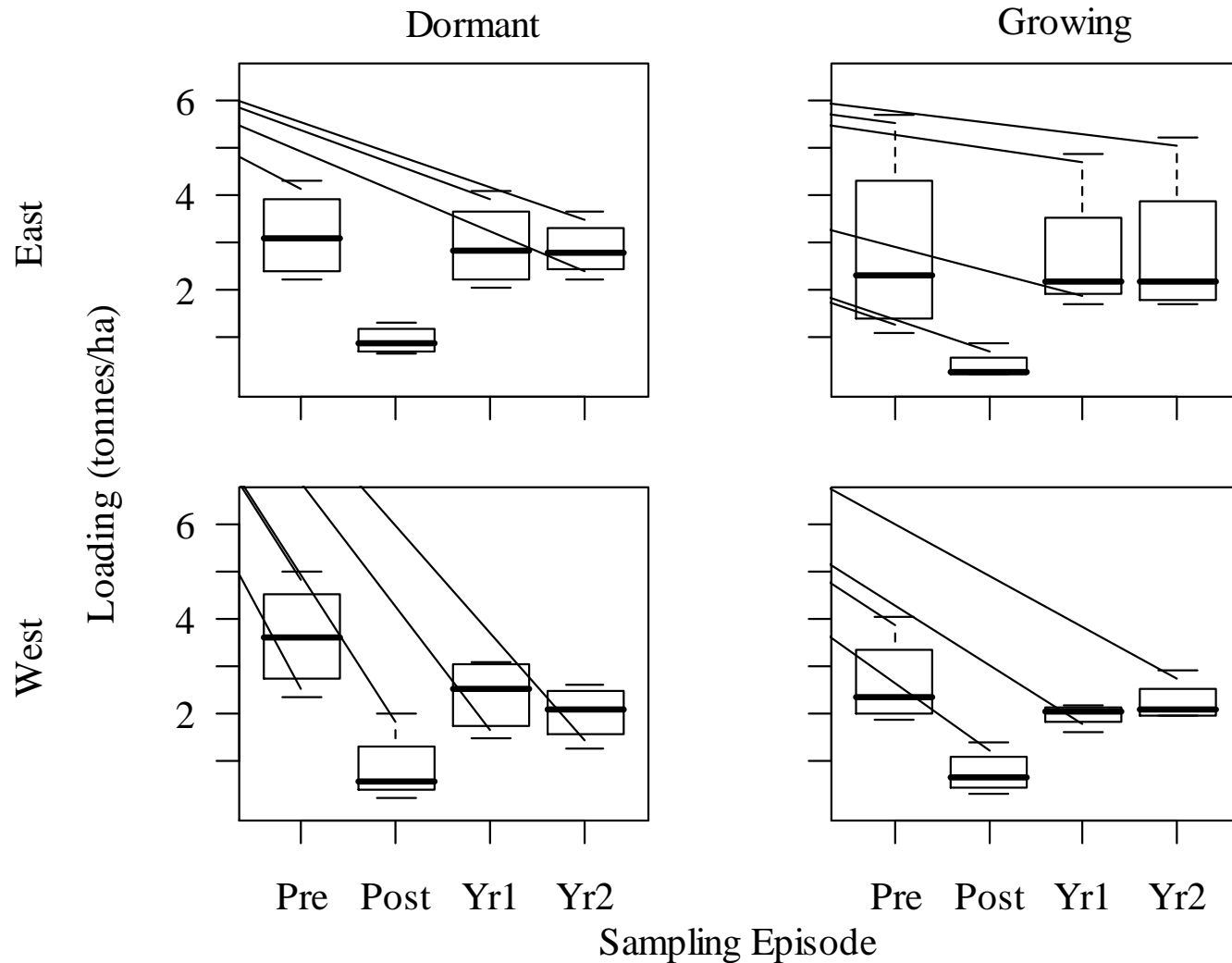
Site (n = 20).



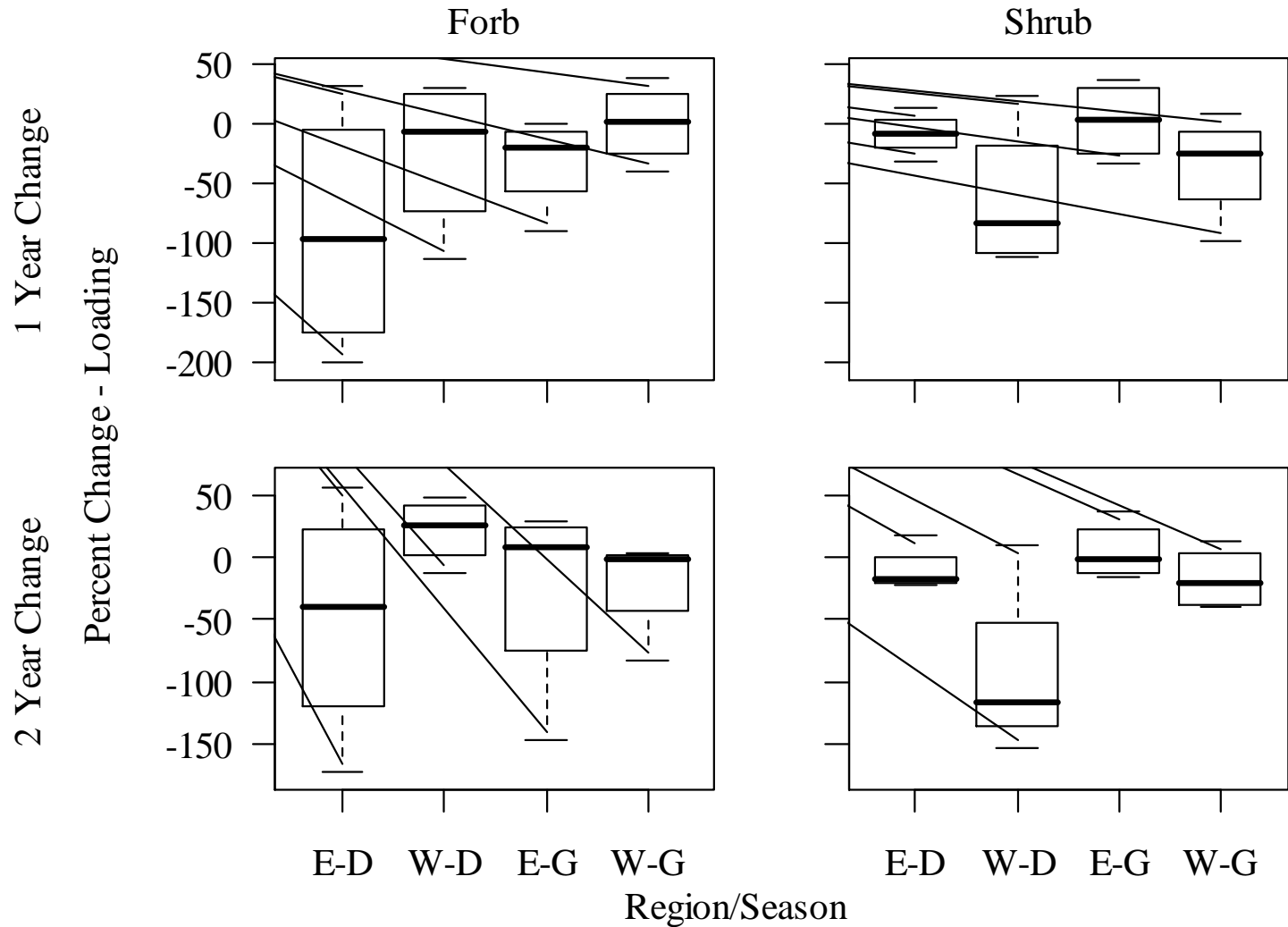
Results: forb loading distribution by season and region



Results: shrub loading distribution by season and region



Results: percent change in fuel class loading by region and season for 1 and 2 year post treatment measurements



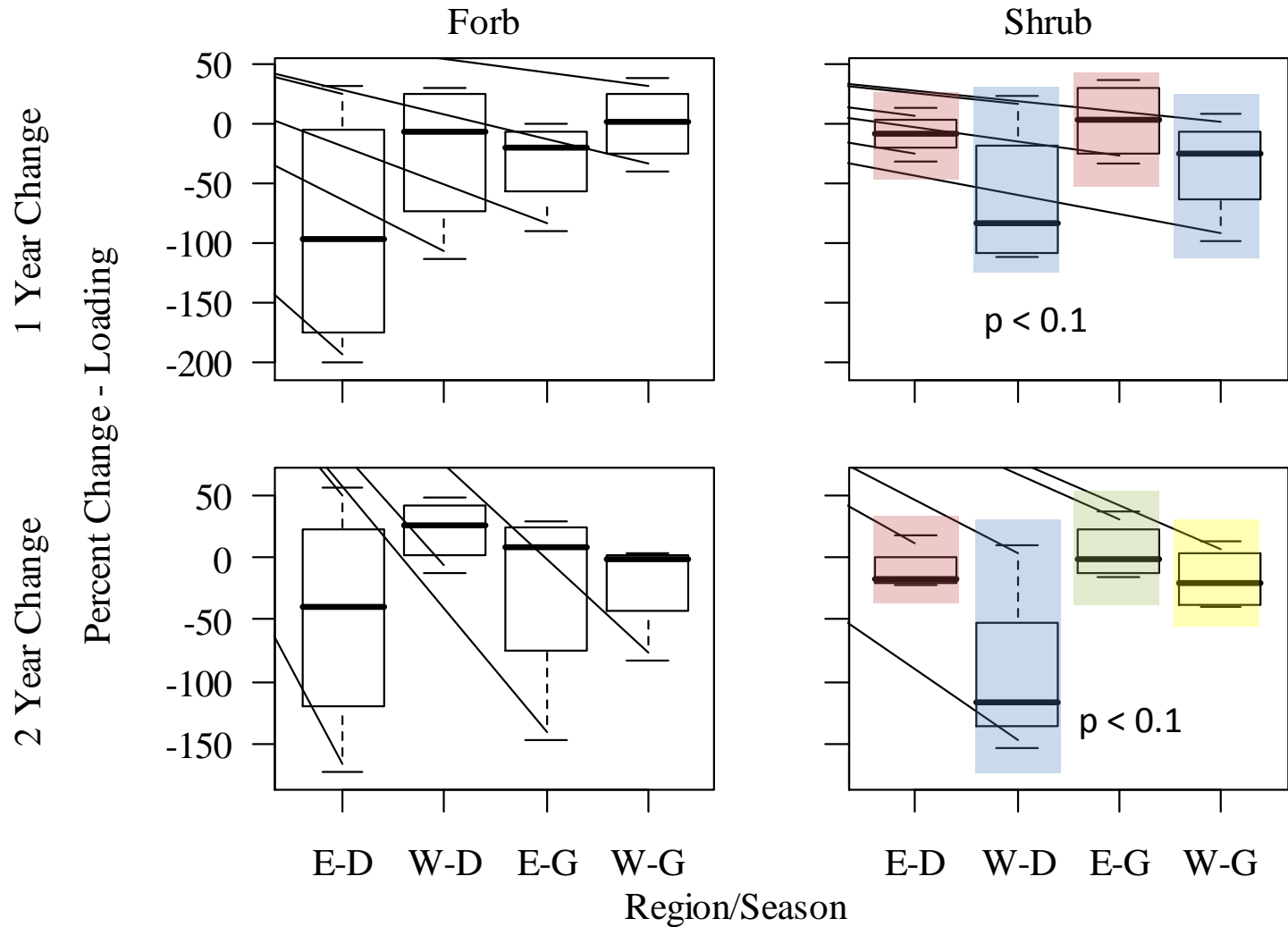
Results: analysis of variance

		F-statistic	P-value
forb	region	2.13	0.1703
1 year	season	1.52	0.2416
shrub	region	4.64	0.0522 [*]
1 year	season	0.88	0.3660
forb	region	1.21	0.2924
2 year	season	0.08	0.7880
shrub	region	3.34	0.0925 [*]
2 year	season	3.47	0.0873 [*]

Significance codes: '***' < 0.001, '**' < 0.01, '*' < 0.05, '.' < 0.1.

- Bartlett's test for constant variance.
- Residuals normally distributed (Shapiro-Wilkes Normality test).

Results: percent change in fuel class loading by region and season for 1 and 2 year post treatment measurements



Conclusions

- Fail to reject both null hypotheses. No effect of season or region on live fuel loading.
- Single burns have little impact on live fuel composition.
- Link between seasonality and understory vegetation is a function of time and fire return interval.

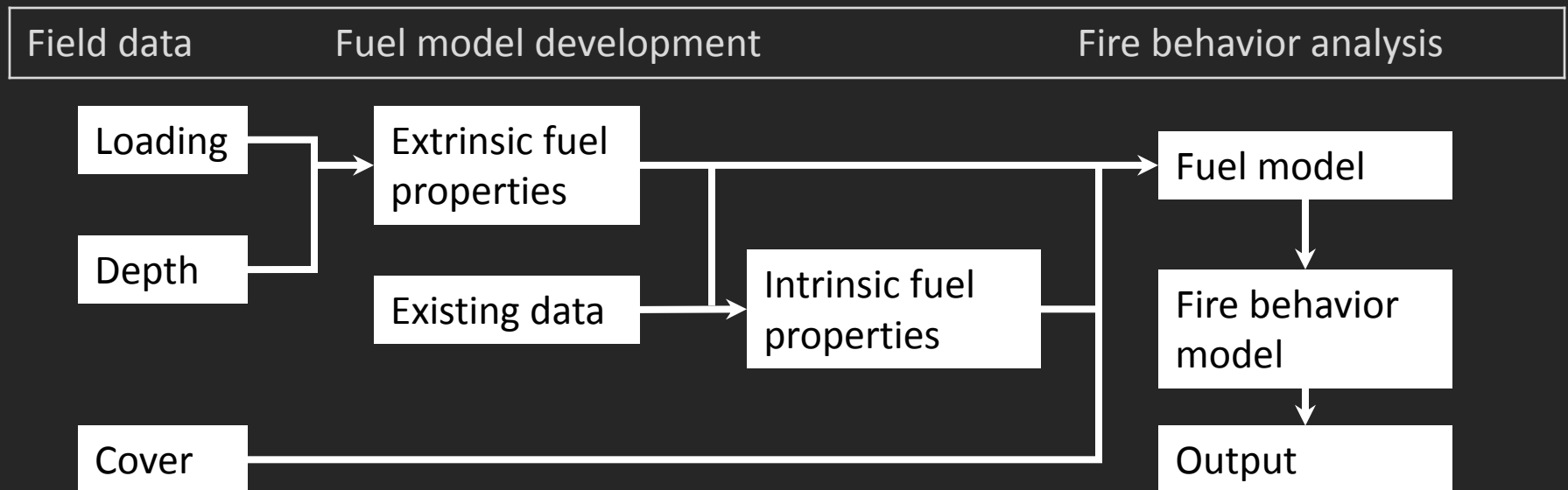


Apalachicola National Forest, Florida.
Jim Cronan, 2012.

Further Analysis

FUEL LIFE CYCLE & FIRE HAZARD

- Incorporate repeated measures into a single model - linear mixed effects.
- Analysis that incorporates full suite of measured fuel variables.



Further analysis

ECOLOGICAL

- Use species level data to explore ecological impacts of treatments.
- Interactions between long term fire history, other site factors and species composition.



Apalachicola National Forest, Florida. Jim Cronan, 2010.

Acknowledgements

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Prescribed fire, Apalachicola National Forest, Florida. Jim Cronan, 2010.



Eglin Air Force Base, Florida. Jim Cronan, 2009.